The Secrets Behind the Product-Making Process

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ABSTRACT

It is a known fact that a product/service oriented company will succeed if it follows an organized approach in its work flow. The product/service project is divided in to several sub tasks and the sub tasks are assigned to individuals. Organized approach helps in managing a planned and controlled development effort. The biggest advantage is that it provides some level of control of the development process and ensures that the actual outcome is consistent with the original requirements. Most of the organizations have a defined work procedure called a "process". The process defines the blue print of project execution. It is observed that though there is a defined procedure for work flow, there is no procedure defined for assignment of tasks to individuals. When the sub tasks are assigned little care is taken to assess the technical strength of the individual to complete the task efficiently. This may lead to compromise in the quality of product/service developed. This paper highlights the importance of considering technical strengths/weakness of individuals before assigning the tasks. The paper introduces 3I's (Intelligence, Idea, Innovation) if followed by organizations sincerely can ensure effective and quality outcome.

Keyword- **Intelligence, Innovation, Idea, Evolutionary Standards, Product**

I. INTRODUCTION

From the very beginning of time humans have been dependent on technology no matter how primitive they were. Even now when we look at the current scenario of the world we are still very much dependent upon technology which have evolved over the years. As matter of fact various technological advancements are now achieved within short period of time. All products and services are usually based on certain technologies. When we think ofsuch magnum opus achievements and milestones we often tend to think upon the complexity of it but we ignore the simplicity of it. Themain objective is to implement and understand these conceptsbeforethestart of the SDLC process (Software development lifecycle).

II. RELATED WORK

Before we proceed let us understand the Kaizen principle:
[2][3]Kaizen is a core concept if implemented in a new business it does not have a problem and the concept works perfectly but if Kaizen is implemented in a well-established business then it takes the entire business to change i.e. from each department level for Kaizen to be successfully implemented. This causes an increase in the workload to the people working in the lower levels of the company. It also deals with the complete change in the current tactics of the company, which stress up the employees due to the change in the mindset and the system.
The Evolutionary Standards overcomes the above mentioned gap. It does allow not the current system of a business to change. It acts as pre-working requirement that has to be complied with before the start of the actual process of the business. It is like an upgrade for the current system. It does not cause any stress rather it increases the confidence and quality of an individual's work efficiency.
The Evolutionary Standards also act as an additional advantage to the Kaizen approach- Process Kaizen. Since the Process Kaizen deals with improvement ofindividuals and their work. The Evolutionary Standards will work effectively and efficiently in the Process Kaizen. Evolutionary Standards can be made an integral part of Process Kaizen as it also mainly focuses on individual improvement through cognitive abilities.

III. THE EVOLUTIONARY STANDARDS

The evolutionary standards are "the compulsory, comprehensive, continuous working requirements which should be undertaken by an individual, group of individuals or an organization before the commission of SDLC process." The theory that the paper explains are the mandatory requirements which the organization must follow. These standards are flexible in nature. It is also known as the 3 I's. They are:

- Intelligence
- Idea
- Innovation

The term "evolutionary standards" means that the standards have evolved since the beginning of time of advancements and will be evolving till the end.The following equation and evolutionary standards flowchart will help us to understand

PRODUCT DEVELOPMENT =INTELLIGENCE+IDEA+INNOVATION

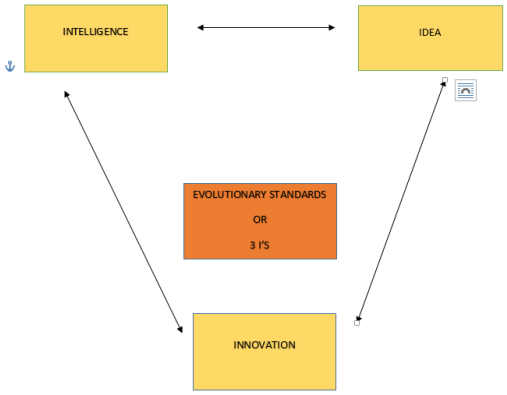

Fig 1 : Evolutionary Standard Diagram

INTELLIGENCE:[1]Intelligence is defined as- "It is a cognitive process of the human mind to receive, understand and infer the information which is received from real world circumstances."

It is a measure or the intangible capacity of the human mind to understand and exhibit appropriate actions to a particular situation. Every individual's IQ is different from each other. Different in every intellectual/intelligence aspect. Intelligence influences the skills to produce efficient results. Skills are dependent on intelligence. There are various skills, some which can be- reasoning, knowledge,problem-solving, creativity, planning, understanding and logical thinking.

Intelligence cannot be compared because they differ in every aspect; especially in one of those aspects where one excel themost. So the comparison between the individual intelligence is notrecommended, but if the organization wantstomeasure the performance they can do it in terms of their productivity which is the result of their intellectual/intelligence aspect while all are working on the same project.

HOW TO IMPLEMENT INTELLIGENCE STANDARD(s)?

There are two procedures:

To implement the intelligence standard we need to follow the first procedure. They are:

- Receive
- Understand
- Infer

RECEIVE:This is the first step. It is the process where the team leader provides vital information to the team members regarding the project. If the intelligence of the team leader is high, then it influences his communication skills. As a result the message is communicated efficiently without any errors or unclear communication. The team members receive information on the various instances of the project. Receiving information by the team members is also influenced by their intelligence. Some may receive it correctly and some may not receive it correctly.

UNDERSTAND:This is the second step. Understand is the process where the team members interpret the meaning of the communicated message by their team leader. The intelligence levels of each team member have an influence on the understanding ability of the team members. So the communicated message can be understood in many ways. Most likely the result would be the correct interpretation of the message or partial interpretation or even the wrong interpretation.

INFER: This is the final step. It is to be noted that understanding is different from inferring. Infer is the process of deducing the meaning of the communicated message. Intelligence plays a crucial factor and itinfluences the inferring ability of the team members. The result of the process would be if the previous 2 steps are done precisely then the end result would be a correct interpretation and accurate actions to be taken on the communicated message or if the previous 2 steps are not done precisely then its consists of errors and less precision which would be a false and misconception of the communicated message.

- To implement the intelligence standard we need to perform the second procedure:
- The organization must select the purpose/area/topic of the product that has to be developed.
- Before starting with the SDLC process the developers in the team should be given proper short-term training in the purpose /area/topic of the product i.e. not technical skills but only for understanding the nature purpose /area/topic of the product.
- Divide the purpose /area/topic into sub purpose /area/topic and assign it in such a way that it should match with the intelligence aspect of the individuals.
- By performing the above steps, it will increase the productivity of the individuals and as well as the productivity of the product. This leads to more co-ordination and team work before the pre-development process of the product.

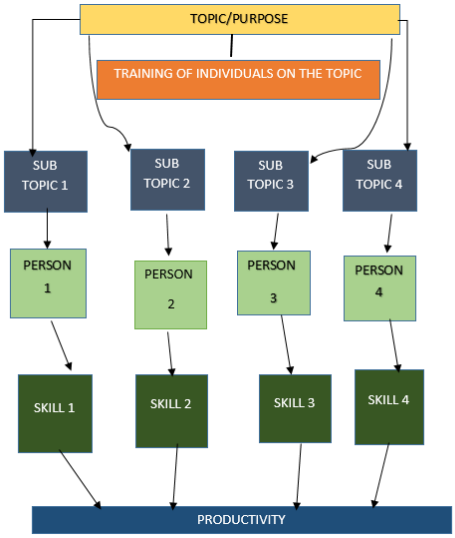

Fig 2 : Intelligence Diagram

CASES TO BE NOTED FOR INTELLIGENCE STANDARD

- If the organization is not able to afford formal training procedure but still can proceed where the individuals train themselves and by helping each other out in the purpose of the product. It cannot be avoided.
- If the organization is able to afford formal training procedure then they should proceed with it. It should be an interactive process.
- The team head should be able to observe and note the intellectual aspects of the individuals in the team.
- If the team is large then the individuals having same intelligence aspects are to be grouped together for a particular sub purpose.

EXAMPLE: Start-up situation

Suppose a team of four is tasked with developing software for educational institutions. The software is ERP which should have the following components-Student portal, employee portal, library maintenance, accounts and

management. They have to first implement the intelligence aspect. Since they have the purpose they are given formal training in the area of the purpose. Then they divide the purpose into sub purpose and assign it in such a way that it should match with the intelligence aspect of the individuals. Let us assume that they are 3 developers and 1 marketing executive which are denoted as D1, D2, D3 and M4 respectively.

- D1's intelligence aspect is logical reasoning i.e. determines the logical aspect of the software e.g. how the functions, operations and other features of the software should be connected and work logically.
- D2's intelligence aspect is problem-solving. When problems arise during the development of the software, they are solved by D2 who is exceptional in this aspect.
- D3's intelligence aspect is creativity. It is basically visualizing the complete software from GUI and how easy it should be for the end users to use the software.
- M4's intelligence aspect is planning and communication. Unlike the others, M4 is responsible for the marketing of the product. This individual knows how to organize people, plan and implement the marketing strategies for the better reception of the product.

  All the individuals have other intellectual/intelligence aspects too but the main aspect determines their IQ which means at what they excel at keeps them unique from each other.

IDEA: Idea can be defined as-"The unclear, initial version of an abstract concept which is the result of sudden or prolonged thought process."
It means that idea is the outcome of the thinking process. These are the vague concepts that appear to the human mind on which they decide further course of action on such concepts. Ideas can always be unique to every individual. They are subjective orobjective. It is the starting point of advancement of everything.

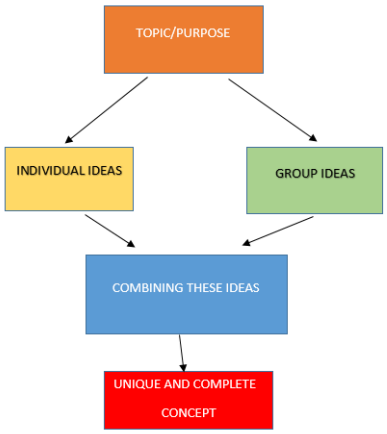

Fig 3 : Idea Diagram

HOW TO IMPLEMENT IDEA STANDARD?
When the organization is done with the first evolutionary standard, next step is that the team should think of some ideas for the product. To implement the standard we need to perform the following steps:

INDIVIDUAL IDEAS: The first step is to let all the individual think ideas related to the purpose of the product. This is necessary because every intelligence aspect differs from each other in turn the quality and the viability of the idea also differs. Every individual's idea must be taken into consideration because there is always a different viewpoint towards the idea. No idea should be given a negative response as it might not be apt for that particular situation but these may come handy in future scenarios. The ideas thought by the individual are done on the basis of his/her main intelligence aspect. This step is important because there is no restriction in imagination of the individuals.

GROUP IDEAS: In the second step the individuals present their ideas from the first step. Here all of them work as a group. They think ideas related to the purpose and work as a team. Everyone has equal voice in their presentation of ideas. There is a chance for a lot of potential which benefitsthe idea and the product as a whole. The common ideas are grouped as one idea and other different ideas are segregated. This step leads to an interactive session which leads to a better understanding of the ideas and of the team as well. Group thinking increases the efficiency and produces more stable ideas when compared to the individual thinkingas it adds a lot of different viewpoints to a particular purpose.

COMBINING THE IDEAS: In the final step, all ideas are considered and the bestidea which is unique and original is chosen in favour ofall themembers of the team. The next is to combine all the individual ideas and the ideas are worked as a group. It results in a clear and original concept. Then the team works on the concept and refine it so that it increases the capability of the product. There will be base/parent idea which is further sub divided into sub/child ideas. The base idea represents the core concept of the product while the sub ideas represent the additional features. The sub ideas can have further sub ideas which are also connected to the base idea. All the sub ideas are interconnected with each other. In the given diagram below explains this step.

EXAMPLE: Start-up situation
Let us assume that a team of six have been tasked to develop a new O/S (operating system). After the implementation of intelligence standard, they now have to implement idea standard. Consider the 6 developers as D1, D2, D3, D4, D5, and D6 respectively who are the best at their intellectual aspect.

INDIVIDUAL IDEAS- In this step D1 and D2 are individually thinking about the GUI, colour scheme, icons, animations etc. D3 and D4 may think ideas individually relating to the logical and mathematical functioning of the O/S respectively. D5 may think on ideas relating to what type of O/S it should and why to choose a specific types, its benefits and its limitations and how to overcome it. D6 may have ideas on what kind of programming languages have to be used, the implementation of coding constructs

and other complex program concepts. All the ideas are influenced by the all developer's intelligence aspect.
GROUP IDEAS- In this step all the developers D1, D2, D3, D4, D5 and D6 have to present their individual ideas and discuss on other ideas as a group. Here allthe developers give ideas on all the modules of the product. They start the interactive discussion on the type of O/S whether it should be Batch O/S, Time sharing O/S, Real time O/S or Networking O/S. Next they discuss on the on the visualization of the O/S like the GUI, animations, objects and how to make the interface attractive and easier so that the naïve users will understand when viewed the O/S. Now the developers work upon the working module of the O/S like the operations i.e. time requirements, systemand interrupt constraints, memory allocation, communication and resource sharing. The last module they discuss is on the kind oflanguage used for writing the O/S like C, C++ or Python etc.

COMBINING THE IDEAS: In the final step, all the ideas from the previous steps are combined together into new, unique, original complete concept. The ideas like the type of O/S-RTO/S (Real time operating system), GUI of O/S, its functionalities and what kind of languages and how are they used are combined together into a complete concept for the organization's product. The base idea is the RTO/S and the sub ideas are the GUI and its additional features, mathematical and logical operations etc.

INNOVATION:
[1]Innovation can be defined as-"The introduction of a new concept, product, service or something of use with a high value that benefits the individual, organization or society as a whole."
In other words innovation can be said as a combination of intelligence, idea and initiation. Every product, service or technology must be constantly innovated. Innovation cannot exist without intelligence and idea standards. It is dependent on it. Initiation refers to the start of the action of the process. It means acting on the idea to make it into a reality by taking necessary steps. It is the major component of Innovation. Following are the equation and flowcharts of innovation:

INNOVATION=INTELLIGENCE+IDEA+INITIATIO N

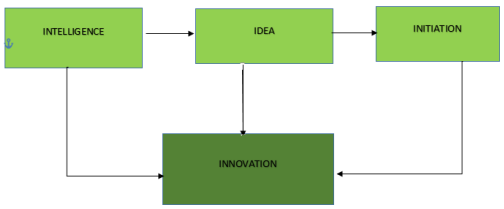

Fig 4 : Innovation Diagram

Innovation can be classified into 3 forms:

INFINITE LEVEL INNOVATION**:** It is a form of innovation where a particular technology its products and services are constantly being upgraded and advanced which they are ingenious in nature and they may or may not be in parallel with the market needs. The innovative products may be an upgrade to an existing product or may be a new product itself or it can even be a new concept. This form may never get outdated.
E.g. Sony has presented a concept of bracelet computer by Hiromi Kiriki. It will take a few years to implement for consumer purpose.
E.g. Google's self- riding cycles which controls itself and detect any obstacles automatically. It can manoeuvre without causing any harm to the rider.

FINITE LEVEL INNOVATION: It is a form of innovation where the products, services of any particular technology have become obsolete. In this form there are no further advancements or upgrades rather this technology has become outdated with time and market demand as these both keep changing from time to time. These products may have "other alternatives" but they don't last long in the area of market and technological growth.
E.g. Pagers and beepers were one-way communication devices used for emergency services. But with time these devices become obsolete.
E.g. Betamax was a video device for video cassette tape format which was a success but had to stop the production with the emergence of VHS.

STATIC LEVEL INNOVATION: In this form of innovation which often relates the purpose of the product. This form explains that the physical devices will be developed, upgraded with additional capabilities and become obsolete, but the purpose for which it is developed never changes i.e. always static. Static level innovation lies between finite and infinite innovation and shares some properties from both.

E.g. VHS, VCRs, Betamax were replaced by VCD and DVD which all these devices were used to play video format files.
E.g. Floppy disks were replaced by CDs, though CDs are not replaced, more easy and flexible to use storage devices were developed like pen drives and external hard drives. All of these devices were used for storage.

HOW TO IMPLEMENT INNOVATION STANDARD?
The third and final evolutionary standard can be implemented in the following way:
Creative Freedom: The organization must allow full creative freedom and should not place restrictions on the creativity of the individuals of the team as it hampers the imagination and thought process leading to less productivity. Creative research methods must be undertaken because since innovation deals with something new, there are some things which have to be known which already exist.
Provision and optimum utilization of resources: Innovation to be at its best the organization must be able to provide a constant supply of financial and non-financial resources for the betterment of the product and of the team as well.

These resources are to be utilized in wise and optimum manner to develop a full potential product.

Monitoring the market and competitor's product: The organization should regularly monitor the market needs and of their competitor's product so that the product their developing is different from others. It's not about comparison but it tells the current position of the organization and also to check whether the efficiency levels match with the vision of the product or it needs some correction.

Time bound project: Though it may look like a restriction but it is not when we understand it at a deeper sense. The product being developed may be based on current or future market need. So the product must be developed with a continuous progress without any gaps or delays. Introducing the product before or after a certain period of time, the product may lose its value which may cause it to be a failure. Fix a proper deadline by considering the resources, man-power, nature and scalability of the project. Timing plays an important role in the success of the project.

Adaptable environment: The environment is a major contributor to the development of the product and as well as the team. It should have factors like motivation, optimistic and encouraging. Innovation comes from an environment which has such inducers and motivators. This boosts up the individual's confidence and unleashes their potential. The environment should be adaptable and sustainable for the growth of the individuals.

To understand the necessity of 3I's in software development organizations a survey was conducted using a questionnaire. About 35 employees working in various software companies have responded and have given their opinions based on their experience and are shown in the chart below.

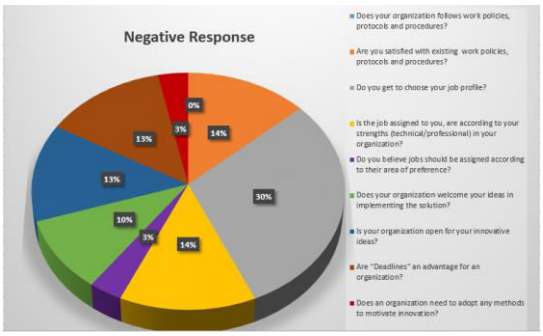

Fig 5 : Analysis Diagram

CONCLUSION

According to the survey conducted and the responses received 30% employees say they do not get to choose their job profile at their work place, 14% say they are not satisfied with the existing work policies and procedures, and 14% say they do not get task according to their technical strength. This means there is a scope for implementing 3I's in organizations for effective outcomes.

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